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New records of peltigericolous fungi from Turkey

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Abstract — Notes on seven species of peltigericolous fungi are provided. Six species (*Capronia peltigerae*, *Dacampia rufescentis*, *Neolamya peltigerae*, *Phoma peltigerae*, *Pronectria robergei*, and *Stigmidium peltideae*) are reported for the first time from Turkey.

Key words — *Ascomycota*, lichenicolous fungi, lichens, *Peltigera*

Introduction

In 2008 we began research to determine the biodiversity of the lichenized fungal genus *Peltigera* in Turkey. Thus far we have conducted field excursions covering about two thirds of Turkey from the Aegean to the Black Sea and the mountains of Anatolia including the south of the Marmara, Aegean, and Mediterranean Regions, the western South-East Region, and the East Black Sea Region including some parts of the East Anatolia Region. Previously collected *Peltigera* specimens in ANES and the Erciyes University lichen herbarium were also examined. Among the several lichenicolous fungi observed on the collected specimens, six represent new records for Turkey and are presented here.

Halıcı (2008) recently provided a key to 117 taxa of lichenicolous *Ascomycota* including mitosporic fungi with their distribution in Turkey. Since the 2008 key, additional new species have been reported and raising the number of known lichenicolous fungi to 155 taxa (Halıcı et al. 2009a). Previously, only two species of peltigericolous fungi were reported in Turkey — *Polycoccum crassum* Vězda and *Refractohilum peltigerae* (Keissl.) D. Hawksw. (Halıcı 2008). The genus *Peltigera,* considered one of the richest genera of lichenized fungus in terms of harboring lichenicolous fungi, should be more carefully examined by lichenologists (Hawksworth 1980). Keys to the peltigericolous fungi have been provided by Hawksworth (1980) and Martínez & Hafellner (1998). The species reported here bring to eight the number of peltigericolous fungi known in Turkey; at least 30 species are expected in the country.

Materials and methods

All the specimens detailed here are stored in ANES (Herbarium of Anadolu University, Science Faculty, Eskişehir, Turkey); their accession numbers are given in parentheses after the locality details. Specimens were examined in water, 10% KOH and Lugol's iodine (MERCK 9261) solutions. Ascospore measurements were determined in water. The descriptive notes provided below are based on the Turkish specimens examined.

Species recorded

Capronia peltigerae (Fuckel) D. Hawksw. 1987
A detailed description is provided by Hawksworth (1980).

Capronia peltigerae, a common lichenicolous fungus species on several *Peltigera* spp., is newly recorded from Turkey. The Turkish specimens have 3-septate, constricted ascospores that are (15–)18–21 × 6–7 µm. The ascospores are hyaline when young, pale brownish when mature, and finely verruculose, as also noted by Zhurbenko (2004) for Russian specimens. The species is pathogenic and causes bleaching in the infected zones of the host thallus.

Afyon: Emirdağ, Dandindere Tabiat Koruma Alanı: *Cedrus libani* forest, 38°50'N, 31° 16'E, alt. 1500 m, on thallus of *Peltigera canina* on soil, 12 June 2008, *M. Candan* (ANES 12283). Küçükburun Mevkii, *Juniperus-Quercus* mixed forest, 38°50'N, 31°15'E, alt. 1500 m, on thallus of *Peltigera* sp. on mosses, 12 June 2008, *M. Candan* (ANES 12282).

Dacampia rufescentis (Vouaux) D. Hawksw. 1986
A detailed description is provided by Vouaux (1912) and Hawksworth (1986).

Dacampia rufescentis, a common lichenicolous fungus species on *Peltigera rufescens* (Weiss) Humb., was collected on *Peltigera praetextata* (Flörke ex Sommerf.) Vain. in Turkey. The species clearly differs from *D. peltigericola* D. Hawksw. & C.J.B. Hitch in forming circular necrotic patches in the host thallus and having ascospores with 3-longitudinal septa. *Dacampia peltigericola* has ascospores with (5–)6-longitudinial septa and does not form necrotic patches (Halıcı & Hawksworth 2008). The Turkish specimen has (6–)8-spored asci that measure 90–105 × 18–22 µm and smooth-walled reddish brown ascospores that are 25–28 × 10–12 µm.

Eskişehir: Türkmendağı, Şelale, 39°30'N, 30°32'E, alt. 1100 m, on *Peltigera praetextata* on mosses, 28 Jul. 2001, *A. Özdemir Türk* (ANES 6710).

Neolamya peltigerae **(Mont.) Theiss. & Syd. 1918**
A detailed description is provided by Keissler (1930) and Ertz (2004).

Neolamya peltigerae was collected on the thallus of *Peltigera didactyla* (With.) J.R. Laundon on mosses on serpentine in *Picea orientalis* forest. This cosmopolitan

species, mainly known on *Peltigera didactyla,* seems to be weakly pathogenic as discoloration occurs in the infected zones of the host thallus. The Turkish specimen has dispersed, immersed to slightly erumpent ascomata, ~ 300 µm, 16-spored asci, 105–113 × 25–26 µm and filiform, slightly curved, 5–7-septate ascospores that are 60–93 × 2.5–3.5 µm and have many slightly greenish oil droplets.

Artvin: Şavşat, North-east of Şavşat, 41°13'N, 42°22'E, alt. 1360 m, on *Peltigera didactyla* on mosses, 31 Aug. 2009, *M. Candan, M. G. Halıcı & Okan Sezer* (ANES 12295).

Phoma peltigerae (P. Karst.) D. Hawksw. 1980

A detailed description is provided by Hawksworth (1981).

This common species was collected from four localities on three different *Peltigera* species (*P. canina* (L.) Willd., *P. elisabethae* Gyeln. and *P. rufescens*). In the Turkish specimens, discoloration in the infected zones is typical with 70–90 µm diam ± immersed pycnidia; conidia are rather abundant, narrowly ellipsoid with rounded apices, 5.5–6.5 × 2.5–3 µm. To test the speculation in Halıcı et al. (2009b), we carefully examined the *Phoma peltigerae*-infected *Peltigera* specimens to determine whether they were also infected by *Dacampia rufescentis* or *D. peltigericola*, but we failed to find any support for the anamorph-teleomorph relationship between *Phoma* and *Dacampia*.

Bilecik: Gölpazarı, East of Kümbet Village, *Pinus nigra* forest, 40°12'N, 30°21'E, alt. 770 m, on the thallus of *Peltigera elisabethae* on mosses, 17 Nov. 2008, *M. Candan & M. G. Halıcı* (ANES 12288).

Bursa: Mustafakemalpaşa: South-east of Çiviliçam Village, *Pinus nigra* forest, 39°53'N, 48°43'E, alt. 910 m, on the thallus of *Peltigera rufescens* on mosses, 21 Nov. 2008, *M. Candan & M. G. Halıcı* (ANES 12289), South of Alpagut Village, *Quercus* forest, 39°51'N, 48°34'E, alt. 460 m, on the thallus of *Peltigera canina* on soil, 22 Nov. 2008, *M. Candan & M. G. Halıcı* (ANES 12286).

Kütahya: Simav, Gölcük Yaylası Mesire Alanı, *Pinus nigra* forest, 39°09'N, 38°29'E, alt. 1340 m, on the thallus of *Peltigera canina* on soil, 23 Nov. 2008, *M. Candan & M. G. Halıcı* (ANES 12287).

Polycoccum crassum Vězda 1970

A detailed description is provided by Hawksworth & Diederich (1988).

This species was reported from the east of Turkey in Halıcı et al. (2007). The collected specimen has abundant perithecia underside of the thallus of *Peltigera canina,* suggesting that the species is commensalistic as reported in Halıcı et al. (2007). Ascospore length is shorter in this collected specimen compared to the first collected specimen in Turkey (24–25 µm *vs.* 25–30 µm) (Halıcı et al. 2007); some 2-septate over-mature ascospores were also seen.

Muğla: Bafa Lake, Sorth-east of Bafa Lake, 37°29'N, 27°32'E, alt. 13 m, on *Peltigera canina* on mosses, 13 Jun. 2009, *M. Candan & Okan Sezer* (ANES 12296).

Pronectria robergei (Mont. & Desm.) Lowen 1990

A detailed description is provided by Keissler (1930).

Pronectria robergei was collected on old and almost dead thalli of *Peltigera rufescens*. Keissler (1930), who also reported this species on dead thalli of several *Peltigera* spp., speculated that this fungus might be saprophytic. The Turkish specimen has immersed to semi-immersed orange-red perithecia that become yellowish when old, 6-spored dextrinoid asci measuring 50–60 × 10–13 µm, and hyaline, smooth walled, 1(–2)-septate ascospores that are 13.5–18 × 5–7 µm with a large oil-droplet in each cell.

Artvin: Şavşat, North-east of Şavşat, 41°13'N 42°22'E, alt. 1360 m, on *Peltigera rufescens* on mosses, *Picea orientalis* forest, 31 Aug. 2009, *M. Candan, M. G. Halıcı & Okan Sezer* (ANES 12299).

Stigmidium peltideae (Vain.) R. Sant. 1960

Detailed descriptions are provided by Santesson (1960), Hawksworth (1975), and Roux & Triebel (1994).

Stigmidium peltideae is a common species on *Peltigera* and *Solorina* spp. characterized by "type a" pseudoparaphyses. The Turkish specimen has subglobose ascomata (35–40 µm) and 1(–2)-septate ascospores (11–12 × 4–5 µm) that are only slightly constricted at the septa. The collected specimen seems to be commensalistic as no damage was observed in the host thalli of *Peltigera praetextata*.

Afyon: Akdağ Tabiat Parkı, Başalan Yaylası, 38°21'N, 30°00'E, alt. 1530 m, on *Peltigera praetextata* on mosses, 03 Jun. 2008, *M. Candan* (ANES 12290).

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